

HIGH ALEXITHYMIA

IN CHILEAN INDIGENOUS AND HISPANIC ADOLESCENT POPULATION A CROSS CULTURAL STUDY

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Abstract

Objective: 20 item Toronto Alexithymia Scale (TAS-20) research with adolescents became increasingly popular the past years yet still there is little to no data examining two different ethnical adolescent groups sharing comparable environment. Furthermore, there are no indications that TAS-20 has ever been used in Chile. We conducted a transcultural comparison investigating the influence of ethnicity, gender and age on a low socioeconomic teenage population. Additionally Confirmatory Factor Analysis (CFA) was performed. **Methods:** In this cohort study of (n=230) 98 indigenous students were compared to the Hispanic control group of (132 participants). Both groups also completed Self Assesment Maniquin (SAM). **Results:** We found proper replicability and internal reliability of TAS-20 and the three-factor solution. We found high alexithymia rates and significant differences between the ethnicities and genders but no influence of age. SAM indicated significant difference in perception of self-esteem and lower dominance rates in the Indigenous sample. **Conclusion:** Although factor 3 (EOT) was inconsistent to some degree, TAS - 20 Spanish Version was found to show proper fit using the original three-

factor structure and resulted to be an appropriate measure for adolescents. Indigenous ethnicity, gender, low socioeconomic status, oppression and power distance in a rural environment contribute to high alexithymia rates.

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Chapter 1

1. Introduction

This dissertation fathoms emotional and behavioral aspects among poor Chilean indigenous and Hispanic students using the Spanish version of the 20-Item Toronto Alexithymia Scale (TAS-20). It also demonstrates the cross-cultural validity of TAS-20 Spanish version and its utilization on poor Chilean adolescent populations. According to our researches this was the first time TAS-20 was used in Chile. The two ethnicities examined are expected to differ significantly in TAS-20 scoring. The authors further assume a deficiency of emotional terminology, emotion regulation and awareness among low income populations. As consequence of such low-socioeconomic status a high TAS-20 score is expected. High TAS-20 scores in both groups would indicate that alexithymia was not only a matter of ethnicity and culture but also consequence of poverty and restriction of social- and income upward mobility chances (high distance to power). There are several other studies researching the influence of high distance to power on emotional behavior and cognition, but unlike other studies we compared two different ethnical populations that share comparable almost equal environmental factors and opportunities. Chilean Government and international institutions support indigenous and low income students, and enforce education in rural areas. There persists a high dropout rate among poor Hispanic and Indigenous students. Chilean teachers of rural public schools describe serious difficulties in communicating with these young adolscents and report to have intense problems reaching their students emotionally. The research was also supported through usage of Self Assessment Manikin (SAM) in order to distinguish self-confidence, happiness and arousal among indigenous and non- indigenous students. We expect that the auto-perception is influenced by ethnicity and that this aspect leads to significant differences among both populations.

2. Background

The term alexithymia originates from the Greek words *léxis* (=read/word) and *thymos* (=mood) and expresses the incapacity to perceive and attribute feelings properly paired with the absence of verbal repertoire regarding moods in people suffering from that syndrome. This multidimensional cognitive construct was firstly introduced during the early 1970s by Sifneos, when he described emotional deficits of psychiatric patients (Sifneos P, 1973). In the past decades numerous scientific articles have been published and much attention was dragged to that field. Since then various scientists brought forward psychosomatic and emotional research regarding this construct.

As a result of diminished communication, alexithymic patients may not express feelings, moods and tensions effectively. The style of thinking happens to be technocratic rather frosty and concrete/externally oriented. Day and night dreaming activities result to be decreased, imaginary processes and fantasy life is impoverished (Ahrens & Deffner, 1985; Sifneos P, 1973; Nemiah, J.C, & Sifneos, 1970). While the Boston psychosomatic school described the syndrome creating the term “Alexithymia” in order to characterize (Nemiah, Freyberger, & Sifneos, 1976; Nemiah, 1977), in France Pierre Marty evolved the concept of externally oriented thinking “*Pensée opératoire*”(Marty & Michel de M'Uzan, 1978), which was firstly introduced into Germany during the mid 1970s by Stephanos (Stephanos, 1973; Stephanos, 1975; Stephanos, Biebl, & W.& Plaum, 1976). Both schools almost simultaneously came to utilize the term “mind-blindness” during their work with psychosomatic patients. While Nemiah and Sifneos considered their psychosomatic patients suffering from alexithymia to be unable to perceive, express and attribute feelings and while putting this down to neurophysiologic processes, Marty and coworkers (Marty et al., 1978) pursued further approaches. They explained alexithymia as an expression of suppressed impulses. During sessions with their patients they came to experience counter-transferences resulting in “projective reduplication”. The subjects

had difficulties to differentiate themselves from the versus and expected, that the opposite would in all aspects comport the way they would do. Kohut (Kohut, 1971) analogically described narcissistic transferences as the “mirror-transference” or “twin-transference”. Since in such counter-transferences the concerning examiner often feels empty, left alone and emotionally impoverished a new term describing that phenomenon “*Rélation blanche*” entered the jargon (Taylor, 1977).

In order to achieve an reliable instrument to measure alexithymia and to establish the alexithymic construct Taylor and coworkers during the mid 1980s (Taylor, J.Ryan, & Bagby, 1985) developed the Toronto Alexithymia Scale containing twenty-six items (TAS-26). The items are responded likert- style. Fifteen of the items resulted positively keyed and eleven keyed negatively (inverted). Even though TAS-26 happened to be the most reliable and valid instrument to measure alexithymia at that time inconsistencies made it necessary to revise the scale. During the early 1990s another version of TAS was developed. The new scale contains twenty items and is known as the most effective and validated measuring instrument for alexithymia up until this day (Parker JDA, Endler NS, Schmitz, Bagby, & Taylor, 1993; Bagby, Parker JDA, & Taylor, 1994a; Bagby, Taylor, & Parker JDA, 1994b). This scale is used most widely around the world. Páez conducted a cross-cultural study and validated the TAS-20 spanish version. The TAS 20 was found a good measurement tool among different cultures (Paez, Martinez Sanchez, & Velasco C., 1999; Taylor, Bagby, & Parker, 2003). The revised TAS-20 scale contains thirteen items of the prior TAS-26 version and also utilizes 5-point likert-scale. The score range is between 20 and 100. All subjects who score 61 and above are considered to be alexithymic. The scale shows a three-factor structure that matches with the construct of alexithymia. Factor 1 assesses the difficulties in identifying feelings and differentiate them from physical sensations which accompany emotional tensions (DIF); Factor 2 assesses difficulties in describing feelings to others (DDF); Factor 3 assesses an externally oriented way of thinking (EOT).

There are several factors that have been found to influence alexithymia in people.

2.1 Effect of age on alexithymia

According to a study among adolescents in Finland, 15-16 year olds had similar alexithymia scores as adult population. The study (n=9432) was representative for that age range in general population (Joukamaa et al., 2007). In this particular study other cofactors such as gender influences differed from those of higher aged population. An older follow-up study (n=5993) in Finland sustains the conclusion that alexithymia is not associated with age (Kokkonen et al., 2001). Then again another Finish study (n=8028) comes to contrary findings. That study was representative for adult population only and age range was wide. Among adults from 35 to 85+ alexithymia was strongly associated to age (Mattila, Salminen, Nummi, & Joukamaa, 2006). Another Finish study (n=882) examined a representative adolescent population within age range of 14 and 16 years of age. Higher scores were detected for the younger group and decreasing alexithymia from early to middle adolescence. It was also concluded that TAS-20 is a good psychometric instrument to assess alexithymia in young adolescents (Sakkinen, Kaltiala-Heino, Ranta, Haataja, & Joukamaa, 2007). An assumption is that higher alexithymia in young adolescence might reflect unsophisticated skills and confusion regarding feelings in young people during puberty. In children emotional distress usually emerges as psychosomatic symptoms because children's cognition skills do not yet allow the abstraction and self-reflection necessary to recognize and verbalize their own emotions and associations with external stressors (Nemzer E, 1996). The age around 9 is essential for it is that period of life when children become aware of reflection upon their own behavior and emotions (Harris, 1989). The following timescale of puberty functions as an intermediate state between childhood and adulthood in which those skills are tested and sophisticated. Thus during childhood abilities of recognition, labeling and comprehension of emotions increase towards adolescence (Bajgar J, Ciarrochi J, & Lane R, 2005). During adolescence cognitive capacities, abilities to abstraction and reflection rapidly increase while approaching adulthood (Cotton N, 2000). The variation of results - whether age generally had an influence on alexithymia - might be related to findings of recent studies. The varying results might represent the personality expressions during different live

stages. Until lately it was postulated that personality shaping ends during late adolescence. Specht et al revealed that personality underlies several changes particularly up until the late twenties and again during retirement ages (Specht, Elgoff, & Schmukle S, 2011) which might influence the age related measures.

2.2 Gender and Alexithymia

There seems to be a connection between power distance and masculinity vs. femininity which are both expected to contribute to Alexithymia in our sample. A cross-cultural study of Paez (Paez et al., 1999) came to the conclusion, that except for Germany and Belgium, there were almost the same gender differences determined for adults within the different countries that were revised. At least for the teenage years until the late adolescence more recent studies indicate that girls from different cultures both score higher than or equal to boys (Joukamaa et al., 2007; Sayar K., Kose S., Grabe H., & Topbas M., 2005).

Much research has been effected regarding accepted male behavior and masculine ideal roles (Lindsey, 1997; Brannon, 1976). Approaching the matter on theoretical basis, literature indicates two important predictive and opponent findings with respect to male and female gender concerning alexithymia. Research on the accuracy with which people can detect physiological indices, as well as on self-reports of symptoms, emotions, and physical exertion suggests that women and men use internal and external cues differently in perceiving and defining bodily states. It is confirmed that women show a significant deficit, differentiating between feelings and corporal sensations. Men on the other hand, utilize internal physical sensations and changes in order to determine how they are feeling. Males are consistently more accurate in detecting physiological signals such as blood pressure, heart rates and blood glucose levels. In a few studies it was researched whether gender had an effect on auto-informing skills regarding physical states. The negative correlation ($r = -.24$) indicates that male participants report sensations more precisely (Roberts & Pennebaker, 1995; Pennebaker JW & Roberts, 1992). Therefore gender does influence subscale 1 (DIF) scores. With regard to what was previously

mentioned, men are expected to score lower than women in that scale. This was the case in Kokkonen's representative study (Kokkonen et al., 2001). Literature also reveals that men have more difficulties in describing their feelings. Regarding to the social acceptance the male gender tends to stoic values that influence the expression of feelings (Springer K.W. & Mouzon, 2008) whereas women are publically more expressive and tend to reveal feelings to others (Noel & Rime, 1988; Paez et al., 1999; Rimé, 2009). During Meta-analysis revision of over 200 studies concerning self disclosure an effect size value of $r=0.09$ was detected (with a positive dimension pointing out that women communicate more than men) (Dindia & Allen, 2009; Paez et al., 1999). Amongst the same gender, men avoid talking about themselves whereas women on the other hand, reveal communicate and support themselves more often and effectively (Derlega & Margulis, 1993). Regarding to the before mentioned, men might be expected to score higher in subscale 2 (DDF) and 3 (EOT). This was the case in the representative Finnish study (Mattila et al., 2006). Meta analysis based studies regarding male social behavior confirm that men express more easily such behavior that is oriented in task completion and other group outcomes, whereas women behave more emotionally-oriented and are concerned with social aspects of interaction and feelings of others. The magnitude of the estimated effect of positive social-emotional behavior and task oriented behavior reached a value of $r=0.28$ (Eagly & Wood, 1991; Edward H. & H.Pleck, 1985; Eagly A & Chaiken S., 1993).

2.3 How low socioeconomic status shapes the syndrome

Somewhat more uniformity among socio-demographic factors displays the role of economic status and education level among participants. Considering only earlier studies without representative population samples the results appeared inconsistent (Kirmayer LJ & Robbins JM., 1993; Parker JDA, Taylor GJ, & Bagby RM., 1989; Pasini A, Delle Chiaie R, Seripa S., & Ciani N., 1992), even though a few studies indicated a possible influence of low socioeconomic status on alexithymia (Borens, Grosse-Schulte, Jaensch, & Kortemme, 1977; Smith GR Jr., 1983). Until later studies that area remained

unexplored for quite some time. Considering Kokkonen's huge cohort study of 2001, alexithymia was strongly associated with poor education and low-income level. Poor communications skills and unsatisfactory interaction were also associated with alexithymia and its effect of success in social matters (Kokkonen et al., 2001). Similar results were presented in a 2006 study which was based on the Finish Health- 2000 study (Mattila et al., 2006). Alexithymia among low educated participants was almost 4 times higher than in educated subjects. Low-income participants reached even higher scores. Two earlier studies sustain those findings (Kauhanen J., 1993; Salminen, Saarijarvi, Aarela, Toikka, & Kauhanen, 1999).

The effect of low income and socioeconomic status on development of alexithymia seems to play an important role in childhood. As mentioned above late childhood and puberty both play an important role in reflection of behavior, reflection of emotions and in sophisticating emotional skills. Within that timescale attention for emotions is developed and if not acknowledged its merit by the parents, that attention will vanish in the child (Rieffe, 2008). According to Berenbaum (Berenbaum J, 1994), in the early 1990s, Alexithymia in adolescents was already associated with diminished family expressiveness and low emotional security in childhood. Lumley (Lumley, Mader, Gramzow, & Papineau, 1996) came to the finding that disturbed family functioning and maternal alexithymia are associated with alexithymia in children. In the same study difficulty identifying feelings (DIF) was put down to dysfunctional family affective involvement; impaired imagination and insufficient family problem-solving skills. Externally oriented way of thinking (EOT) was related to deficient family behavior control. Joukamaa M. came to similar conclusions in a later more representative study that formed part of the big Finish birth cohort study (n=6023) (Joukamaa et al., 2000). The study related rural areas, poor social situation of the mother and low levels of positive communication in childhood to development of alexithymia. This sustains the assumptions of Rieffe that relates lack of emotional attention by the parents to alexithymia involvement in their children. In 2003 the correlation between alexithymic mothers and their children formed also part of a smaller study (n=232) among college

students (Yagi, Koyama, & Fukunishi, 2003) and their mothers. A significant correlation was determined. Joukamaa's latest 2007 big cohort study (n=9432) among adolescents again correlated mothers low education, broken childhood home and rural areas to high alexithymia scores (Joukamaa et al., 2007).

2.4 Alexithymia and its genetic dependencies

An interesting aspect to spot in this context seems to be the dependence of genetic influences on those families where parents are considered alexithymic themselves. Is it the parent inheriting the child alexithymic aspects or is it only the environment causing the syndrome to appear within the family? In 2001 a twin study by Berenbaum and Velera indicated significant familial influences in contributing to all of these factors. It was displayed that maximum-likelihood and interclass correlations parameters indicated that externally oriented way of thinking (EOT) factor was moderately to strongly influenced by genetic factors and not at all or little influenced by familial environmental factors. Factor 1 difficulties in identifying feelings (DIF) instead might only be weakly influenced by genetic factors and moderately influenced by familial environment whereas Factor 2 difficulties in describing feelings to others (DDF) might not be influenced at all by genetic factors but only by familial environment (Valera & Berenbaum, 2001). As indicated, development of alexithymia tends to be explained by multifactorial genesis, although it has to be noted that more investigation needs to be undertaken.

2.5 Cultural and societal influences on alexithymia evolvement

Both familial- and genetic- cultural influences on alexithymia play an important role in the shaping of the syndrome itself. In the late 1960s Kleinman began to investigate the role of culture and its influence on illness within Chinese population. In particular he stated that the dependence of physical symptoms and feelings in collectivistic population is labeled differently than in individualistic western populations. After comparing and

contrasting rates at which symptoms were classified, he found out that the Chinese would make other interpretations of symptoms than American individuals would do. He indicated that Chinese medical concepts more likely attended somatic explanations over psychological concepts. In his understanding those cultural differences caused radically lower prevalence rates of depression in China when compared to the United States (Kleinman, 1986). The usage of a rather somatic way of expression and its acceptance in collectivistic eastern cultures thus is higher than in individualized western cultures. With regard to the before mentioned in collectivistic societies the cognitive development of internal attribution of emotions seems disturbed (Paez et al., 1999). Distinction between physical sensations and feelings are less evolved in eastern cultures. Rather than to tend psychological relegations the bodily aspects of emotions; interpersonal relationships, moral, political and religious aspects may be addressed instead (Kirmayer, 1987). Social roles and shared group identity constitute the common collectivistic values and replace individualized perceptions (Matsumoto, 1989). There has been a certain discussion based on Kirmayer's publications whether alexithymia was a clearly distinct Syndrome or rather a cultural or psychological variance of expression and attribution of emotions. This approach could not be established, numerous publications since then regarding the syndrome appeared during the last decades strengthening the concept of alexithymia. An interesting field to cast a light on seems to be the extent of which genetic factors influence these behavioral and perceptual aspects among Asian cultures. With regard to the before assessed there seem to be genetic influences on the evolvement of alexithymia. Presuming the latest developments on the Native American settlement research indigenous population originates from Asian settlers (Reich & Canizales-Quinteros, 2012). Therefore, given comparable societal and environmental influences over the two ethnic groups examined in this study, higher scores for indigenous population are expected. Having pointed out higher alexithymia rates among collectivistic cultures, on the contrary individualized western cultures value their feelings, independence and introspection skills. Leff stated that if cultures reach a high level of individualization they develop sophisticated mental and psychological terms and languages (Leff, 1977). Physical

sensations are well separated from psychological symptoms and a highly elaborated emotional vocabulary is used. With regard to before stated, therefore it would be justified to reason that obvious fundamentals accompany the two cultures displayed. Western - low distance to power - cultures emphasize equality among different social positions. Communicating negative emotions is tolerated and desired. The collectivistic culture establishes a social order, which might be considered power distant. Those cultures are distinguished by emphasized differences of power between individuals. Relationships tend to be hierarchical and vertically accentuated. Children for instance treat their parents with respect, parents teach children obedience. At school, teachers are expected to take all initiatives in class and are treated like gurus who transfer personal wisdom. Societies tend to be centralized; salary ranges are high; status symbols and privileges for leading individuals are expected and popular. Inequalities among people are expected on both sides of hierarchy and are often even desired. Particularly, communications of negative emotions out of social situations may be considered a threat to the existing social order and thus are more likely avoided (Hofstede, 1991; Matsumoto, 1989; Paez et al., 1999). Injustice and inequality are also expected and often taken for granted. Both Hofstede and Matsumoto found a negative correlation between power distance and anger; fear; sadness. Matsumoto also found a negative correlation between high power distance and identification of happiness. Thus one might assume that there may not solely be a social desire and expectation to not express emotions, but there may also be certain incapacities to perceive these emotional signals. Those assumptions are particularly supported for Hispanic sample by Páez & Vergara. They found a lower scoring on internal reactions that were deriving from negative emotions which indicates a low emotional profile and affinity to stoic tendencies (Paez & Vergara, 1995; Paez et al., 1999).

2.6 Power distant cultures contribute to alexithymia

Having pointed out power distance there is another important aspect that must be raised. Hofstede separated masculine cultures from feminine cultures. Masculine cultures may be characterized by clearly distinct gender roles, assertiveness and competition. Men are supposed to be focused on material success and expected to be tough whereas women are supposed to be more modest, concerned with life quality and tenderness. Femininity pertains to societies in which gender roles approach, where roles are overlapping and both genders are supposed to be tender, modest and concerned with life quality (Hofstede, 1991).

Thus there seems to be a connection between power distance and masculinity vs. femininity. It is likely that in high power distant societies strict social roles prevail since distinct power distribution among people and their roles is accepted and desired. Injustice and autocracy is more accepted between the genders than in societies where power distance is small. In those societies instead injustice is less accepted due to more democratic and deliberated values.

2.7 Chilean population structure presupposes to alexithymia

This study was carried out in southern Chile. Chilean citizens in the last century have suffered from extreme political changes. The spectrum stretched from collectivistic communist regime to right wing- dictatorship finally coming to democracy in 1989. In Latin-America Chile with 14.967 US Dollars has almost the highest annual income level per capita (Foreign Ministry of Germany, 2012). Economically first -world rating is in sight. The U.N. consider Chile's development as "High Human Development" (2009). Nevertheless income disparities remain. (UNDP, 2009).

As almost every Latin-American state half of the population is centralized in the capital, whereas the remaining population is dispersed in rather rural areas. The society is considered catholic, high power distant, and predominately masculine. As in many first

world societies, The growth rate of Chile has decayed to 1,25%. Fecundity rates are at 1,89 children per women, mortality is decreasing and age related dysfunctions are increasing (Acuna, Pérez, Villalón, & Villalón, 2010; Damiánovic, Villalon, Espinosa, Ghio, & Pavez, 2008). As for the masculine predominated society, women hold 54% of the total work and 95% of unremunerated domestic work. High salary gaps between the sexes have been found to persist in all occupational sectors (Bravo, 2004; INE, 2009). For female citizens the prediction is that their main goals will be for them to be considered daughters during childhood, to become students in the early life stages, to give birth to own children then to dedicate themselves to unremunerated domestic work and to take care of social and health related familial aspects. For males it is officially expected after childhood at first, to become students; college students then take the role as patriarchs of the family and eventually convert to remunerated workers before they retire. Between the ages of 15-19, gender differences already come to notice. 10% of the girls work in remunerated jobs whereas 17% of the boys work respectively. 14% of the girls within the same age range work unremunerated at home whereas only 5% of the boys attend unremunerated domestic duties (Bravo, 2004).

Already at school high power distance is notable. The education system is rigid. Teachers are considered to be of major importance and are treated with distance and utmost respect. An inspector controls students' appearance as soon as they enter the school. They inspect school uniforms, nails and facial hair; beard shaving is an obligation. In the classroom the students rise when any teacher or adult enters the room until they are authorized to sit. Classroom separation by sex is also a common practice. Sometimes classrooms are divided in half; one side is for boys the other side for girls. It is also common procedure to only operate sex-separated schools where only boys or only girls are accepted for inscription. Most facilities have late schedules and some rural public schools even offer residential services. It seems to be apparent that due to the amount of time students spend in their schools those facilities have notable influence in the children's development.

The majority of Chilean population is Hispanic and mestizo, about 4,6% is considered indigenous. The Mapuche tribe which is counting 87,3% of all indigenous citizens is the

largest tribe (CONADI, 2010a). The Mapuche population is mostly gathered in 9th Araucania Region and in Santiago, Chile's capital. Not only main Chilean population is suffering from injustice and high power distance, especially indigenous populations suffer severe oppression. Since 1993 Chilean state indigenous organization CONADI began to take care of indigenous development and matters in order to achieve a multicultural society where indigenous citizens become more accepted. Several laws and economic funds were driven forth in the past years assuring that aim (CONADI, 2010b). Not only Chilean socioeconomic and societal factors result in a large fundament that contributes to development of alexithymia among Chilean citizens; particularly it's indigenous population, (mostly low income workers, with their rituals and own spiritual beliefs) are concerned.

The Mapuche concept of sickness consists of two different basic ways of explanation. The first is describing the bodily aspects of sickness and consists of ethnical mapuche diseases called "mapuche kutran", as well as of biological causes of sickness so called "wigka kutran". The second way of explanation is the spiritual aspect of sickness. A supernatural cause is displayed and called "Wenu kutran" which is related to the spirits called "Wenu mapu" (Pérez Sales, Durán Pérez, & Bacic Herzfeld, 2005).

Perez Sales in a further cross-cultural pain study examined Mapuche participants. Grief as a psychological entity is not well recognized. Sales described with respect to the main belief of the Mapuche people that grief commonly leads to bone pains, headaches, to fleas or skin infections. In Mapuche common believe grief rather leads to bodily aspects of sickness (Pérez Sales & Lucena, 2000). Nevertheless healers, so called "machi", are of importance when it comes to mind- "loosing" of the mourner. This circumstance then is ascribed to the bad influence that the lost soul of the dead relative has over the mourner. To avoid such, the person in grief must fulfill a certain ceremony bagging the deceased for relief so it would accomplish its journey to "Wenü Mapu" or "Ka Mapu", the land of the good where deceased people reunite and live a similar life as it was lived on earth before.

The Mapuche's traditional way of perception of intrapsychic matters indicates a lack of emotional processing, at least if modern psychiatric standards are applied (Guevara Kamm, Sepulveda E., & Brosig, 2016). To display the way of attribution a quotation of a Mapuche participant in grief appears to be useful:

"I get sad and when I think about it I suffer from bad colon" (Pérez Sales et al., 2000)

To directly assess pleasure, arousal, and dominance, we used a non-verbal pictorial assessment technique - the Self-Assessment Manikin (SAM). To measure affective conditions that go beyond verbal and writing skills, we applied this measurement tool in order to achieve a general daily impression between the two cultures that were examined. In the 1980s Lang (Hodes, Cook, & Lang, 1985) devised this picture-oriented instrument which was originally introduced as an interactive computer program. It later was expanded to a paper-and-pencil version for mass screening and group –use purposes. SAM's ratings have shown almost perfect match with the corresponding factors obtained from the Semantic Differential Scale developed in 1974 by Mehrabian and Russel (Bradley & Lang, 1994). In *Figure 5* we display the paper-and-pencil version of SAM five point likert scale demonstrating its non-verbal, graphic illustration representing the three major affective dimensions. SAM's pleasure dimension is assessed by a figure that ranges from a smiling figure to an unhappy frowning one. Arousal dimension ranges from an excited, wide-eyed figure to a relaxed, sleepy figure. The dominance dimension is assessed by changes of the size of each manikin where a large figure indicates maximum control of the situation. The participants are instructed to look at the manikins in order to define their emotional condition of the day by assigning those conditions to the correspondent manikin. The participants may not only mark a manikin directly but are also entitled to set a mark between the figures.

To summarize, the goal of this study was the almost equal environment the students were exposed to and the application of CFA in order to address two important yet unresolved issues concerning alexithymia: (1) is there an ethnical influence on alexithymia that goes beyond socioeconomic variables in a non-clinical sample; and (2) is the measure appropriate for Chilean adolescents.

Chapter 2

Materials and Methods

A. Sample

Our Study investigates two different ethnical adolescent groups (Hispanic and Indigenous) sharing comparable socioeconomic, residential and educational environment. The selection of the area was effected by advice of state indigenous organization CONADI in 9th Araucania- Region of southern Chile. Over 62.5% of the students that were examined are officially considered to be threatened by social vulnerability and also categorized as low-socioeconomic by Chilean government (SIMCE & Gobierno de Chile, 2010). Average total familial income rates in all of the three examined schools are 350 USD per month. Each school is sex mixed. 230 students participated in this study. 55.3% were female 44.2% male participants. The students' ages ranged from 13 to 20 years old with an agglomeration of 86.2% between 14 and 17 years. The average age was 15.5 years. 42.2 % were categorized Indigenous and 57.8% Hispanic. Ethnical separation of results was effected by a Mapuche tribe member. The tests were separated correspondent to the ethnical provenance of each surname. In Chile surnames, by law, must carry first surname of the father and first surname of the mother respectively. All participants carrying one or two indigenous surnames were considered indigenous and placed in indigenous group. All remaining Hispanic participants were allocated in the Hispanic control group. All adolescents participating in this study were able to understand and write Spanish language. The study was effected under knowledge and support of the local education departments, mayors, school directors, teachers and state organization CONADI. The students' freewill was respected and participation was voluntarily. However, all students participated.

B. Measures

Alexithymia was measured by TAS-20 which is the most widely and also most carefully validated tool until today. Its test-retest reliability, internal consistency and discriminant, convergent, concurrent and factorial validity have been considered to be good (Bagby et al., 1994a; Bagby et al., 1994b; Parker JDA et al., 1993). Its proper cross cultural use has been proved in several studies (Paez et al., 1999; Taylor et al., 2003). We used the most common Spanish TAS-20 version which validity is also known to be good (Taylor et al., 2003; Martinez Sanchez, 1996). To assess prevalence of alexithymia we used cutoff point of ≥ 61 . The scale shows a three-factor structure that matches with the construct of alexithymia. Factor 1 assesses the difficulties in identifying feelings and differentiate them from physical sensations which accompany emotional tensions (DIF); Factor 2 assesses difficulties in describing feelings to others (DDF); Factor 3 assesses an externally oriented way of thinking (EOT). The three-factor structure is most commonly applied and superior to one, two or four-factor structure (Taylor, Taylor, & Bagby, 2003; Popp et al., 2008). It could be replicated in several highly diverse cultures and thus constitutes the best factor-structure to be used for cross-cultural research (Taylor et al., 2003).

Additionally, a non-verbal pictorial assessment technique (SAM) was conducted with 142 participants in order to investigate affective dimensions (pleasure, arousal, and dominance) that go beyond verbal and literal skills. This test is well validated and is considered a good measurement tool (Hodes et al., 1985) which is also often used in children.

C. Procedure

The tests were effected during regular school schedule. Teachers were informed on short notice of the performance. Teachers and staff involved in this study entered the classroom together and the students were instructed regarding the execution of the tests. They were then informed about the purpose of the tests, which was described as measurement of their feelings and expressions. The participants were notified that the collected data was treated strictly anonymously and that neither their teachers and parents nor the school authorities or local departments would be informed about the outcome in a personalized way. The participation was completely voluntary. The participants then filled out the forms under supervision of staff and their teachers.

D. Statistical Methods

The Data was analyzed using the SPSS Statistics Version 21. TAS total score and subscale scores were compared between the sexes and the ethnic groups by use of student t-test. The Shapiro Wilk Test indicated that the population was normally distributed. Scores of ethnic groups were also compared by one-way analysis of variance (ANOVA). In order to compare different groups we separated per sex, age, school class, ethnicity and subscales. The sample was considered large enough to sub classify groups (Taylor et al., 2003). Correlation between the groups was effected per Pearson. For between-group comparisons we additionally conducted Pearson's chi-square test. We selected the three factor model solution consisting of DIF, DDF and EOT. A translation error in item 12 was located afterwards. As recommended by the developer of the scale, CFA is the desirable approach for testing the validity of the TAS-20 in different populations and considered as a valid tool for cross-cultural research (Taylor et al., 2003). In order to assure the measure was accurate for Chilean population CFA was conducted using SPSS Amos Version 20. We used several indices to evaluate the Goodness Of Fit of the proposed model. Each indice has its particular strength and weaknesses: the goodness-of-

fit index (GFI: a score > 0.85), the adjusted goodness-of-fit index (AGFI: a score > 0.80) and the root-mean-square-error-of-approximation (RMSEA: a score < 0.08). We also used the ratio of the chi-square to its degrees of freedom (χ^2/df ratio), with a criterion of a value < 5 and preferable < 2 . The sample also resulted large enough to perform CFA (Marsh HW, Balla JR, & McDonald RP., 1988).

Chapter III

Results

A. Confirmatory Factor Analysis

The parameter estimates from the CFA and correlations for the relationships among the three factors are demonstrated in table 1. Between factors 1 and 2 the estimates were significant ($P < 0.01$) for the sample. Between factors 1 and 3 and between Factors 2 and 3 relationships were not significant. The measures of fit $GFI=0.915$, $AGFI= 0.89$, $RMSEA= 0.039$ are presented in table 2. The chi square/df ratio was <2 .

B. Descriptive Statistics

The mean total score of TAS-20 was (60.95, SD: 10.80). The mean score for Hispanic sample was (59.35, SD: 11.09) and for the indigenous sample (63.14, SD: 10.04) as demonstrated in table 3. The mean score variation between both ethnical samples was significant ($p < 0.01$). The mean score for factor DIF was (22.08, SD: 6.77) for the Hispanic and (24.01, SD: 5.74) for the Indigenous sample. The score difference was significant ($p < 0.05$). Regarding Factor DDF score difference was significant ($p < 0.05$), mean score was (15.69, SD: 4.14) for the Hispanic and (16.62, SD: 3.97) for the Indigenous sample. Referring to factor EOT scores were (21.66, SD: 4.56) and (22.70, SD: 3.69) respectively also with a significant ethnical difference ($p < 0.05$).

When cut-off score was applied to the total TAS-20 score, ethnical differences remained significant ($p < 0.05$) as presented in table 4. 56.0% of the total sample can be considered alexithymic. Separated in ethnicities 50.0% of the Hispanic sample and 64.2% of Indigenous sample can be considered alexithymic. Figure 1 displays a graphic interpretation between the ethnicities.

C. Group Statistics

In this study gender difference in factor 1 (DIF) regarding to non-parametric correlation was statistically significant ($p < 0.05$). The mean score of girls (23.38, SD: 6.83) was higher than the mean score of the boys (22.31, SD: 5.83). Regarding factor 3 (EOT) both parametric and non-parametric statistics indicated that girls with (21.62, SD: 4.28) scored significantly lower ($p < 0.05$) on that scale than boys (22.7, SD: 4.13). Also in mean TAS-20 score and in DDF scale girls scored higher than boys as displayed in table 5, although differences were not considered significant. When cut-off was applied 61.6% of the girls and 49.0% of the boys can be considered alexithymic as presented in figure 1, gender difference then did result significant ($p < 0.05$) as presented in table 6.

We then revised the sample by ethnicities and again applied statistical procedure. 71.7 % of the indigenous girls can be considered alexithymic whereas only 54.2% of the Hispanic girls were alexithymic as presented in figure 2. Indigenous girls were 16.9% more alexithymic than indigenous boys. In the Hispanic control group girls were only 9.4% more alexithymic than boys.

D. Age Distribution of Alexithymia

We found no age influence on total TAS-20 score. The repartition of the most important age groups in our sample, the different TAS-20 mean scores of the same age groups and prevalence of alexithymia among the different age groups are displayed in figure 3 and 4. Even when we applied cut-off we did not note any different tendencies. 16-year age group with 69.4% reached the highest TAS-20 score. While the 17-year age and 18-year age groups reached the lowest scores with 48.3% and 47.1% respectively.

E. Self Assessment Manikin

Indigenous sample with 3.2 (SD: 1.04) scored significantly lower than the Hispanic sample that scored 3.79 (SD: 0.85) on the SAM dominance dimension ($P < 0.01$) demonstrating low power-control and low management of the situation. We can note that the Indigenous sample scored significantly higher in pleasure ($P < 0.05$) and lower in arousal dimension indicating lower pleasure and higher arousal since both dimensions are negatively keyed in SAM (table 7).

Chapter IV

Discussion

The overall findings of this study were the applicability of Spanish TAS-20 on a Chilean adolescent sample, the detection of high alexithymia scores and significant differences between the ethnicities and genders. Alexithymia can be associated to ethnicity, gender, disadvantageous and high power distant living conditions, but cannot be related to age (Guevara Kamm et al., 2016). SAM indicates a lack of dominance and control over the situation in the Indigenous sample.

Comparing to revised publications the measured scores were considered high. The first aspect to examine is if the tool measures the characteristics of the syndrome accurately. CFA displays a good reliability and applicability of TAS-20 with regard to our sample. However we have to mention that some parameter estimates regarding EOT were unsatisfactory. Between factors 1 and 3 and Factors 2 and 3 relationships were not significant which we ascribed to the inconsistencies regarding factor 3. In literature it has been well documented that deviations particularly pertain factor 3 of the original model (Bagby et al., 1994a). Nevertheless inspection of the parameter estimates obtained from CFAs revealed that for several samples the parameter estimates for one or more of the negatively keyed items on factor 3 were non-significant (Taylor et al., 2003). This is further supported by a more recent study which considers the 3 factor model the best solution even if inconsistencies appear (Meganck, Vanheule, & Desme, 2008). Under these specific circumstances lower factor loadings can be considered acceptable (Buehner M., 2010; Kline P., 1994). Particularly challenging was the result of item 12 (0,18) of DDF scale. Neither was that scale known to produce factor inconsistencies, nor was that factor negatively keyed. In the revision of the translation a serious error in the translation to Spanish was found making the item poorly comprehensible. The reversed translation was *“The people ask me to explain with my feelings with more details”*. The double use of the word “with” also made it hard for the Chilean part of our team to understand the meaning since the phrase was even less comprehensible in Spanish. Having assessed

these specific particularities and taking into account that large sample sizes commonly influence fit indices as an artifact and that our sample size was $n=230$, our goodness of fit indices thus indicate a good support for the original three factor model.

TAS-20 became a reliable measurement instrument for adolescents (Berenbaum J, 1994; de Putte, Engelbert, Kuis, Kimpfen, & Uiterwaal, 2007; Honkalampi et al., 2009; Joukamaa et al., 2007; Lumley et al., 1996; Sakkinen et al., 2007; Sayar K. & Topbas M., 2005; Valera et al., 2001; Yagi et al., 2003; Zimmermann, 2006). However a Canadian study of J. Parker, one of the inventors of the scale indicates that the quality of measurement deteriorates progressively with younger age. An appropriate adaption of the item wordings for young adolescents and further validation is recommended (Parker JDA, Eastabrook JM, Keefer KV, & Wood LM, 2010). We came to opposite findings. The comparison of the study's results was undertaken. Firstly, our mean age was comparable. Thus such a comparison was considered valid. Interpretation of the results was challenging. In the Canadian study the inconsistencies were mainly ascribed to low reading capacity and complexity of the measure especially regarding factor 3 (Parker JDA et al., 2010). But for Canadians semi-illiterate rates are generally considered high (ABC Literacy Foundation, 2005). Also the sample contains clinical participants (e.g. inattention-hyperactivities; learning-disorders), who are likely to show even lower reading skills and more co-morbidities influencing the measure. As the author stated the psychometric problems encountered in that sample are likely to be exacerbated. 18.9% of the participants did not declare their ethnical background at all, leaving open to which extent other ethnicities were present and how good their reading skills were. 10.1 % self identified as Asian, Aboriginal Canadian and "Others". Aboriginals and immigrants show higher functional illiteracy than "Caucasian white" Canadians (ABC Literacy Foundation, 2005). Our sample instead has been conducted in a school-based environment under almost perfect conditions, showing an average student skill level and ethnical background. Chile has the third lowest illiterate rate in Latin America (Alfalit, 2009). The national university entrance qualification test indicated that the participants of our study obtained language- results that were higher or slightly lower than the national

average (DEMRE, 2012), similar results were obtained in a national reading proficiency test (Agencia de Calidad de la Educación, 2010). Inconsistencies in our study only regard factor 3 (EOT) whereas Parkers study also concerns factor 1 (DIF). Furthermore age had no effect on alexithymia, whereas in the Canadian study mean scores significantly increased with younger age. There are indications that the English TAS-20 version is more difficult to understand than the Spanish version. Parker worked with the original English version of the test which contains certain complexness and requires interpretational skills. Our measure was the validated Spanish Version. The translation to the Spanish version is not exactly the same as it was written in the original version. One item for instance that produced inconsistencies in factor 3 of Parkers Canadian test was item 5 “*I prefer to analyze problems rather than just describe them. (reverse keyed)*”. The Spanish version described the sentence in re- translation as: “*I prefer to analyze the problems instead of describing or explaining them*”. The comparison of the two sentences indicates that the Spanish sentence relays higher amounts of words to describe the situation and while density of information is lower, whereas the English version uses less words and higher density of information in one sentence. This finding leads to the important situation that Spanish is describing the meaning of a sentence more precisely than it would be described in English leaving less space for interpretations. The information density of the Spanish language was found to be 0,61 whereas English was 0,91 indicating high density of information in the sentence in English and low density in Spanish. Among a cross language comparison English ranked first place indicating highest density of all 7 languages, only the reference language Vietnamese (1,0) was considered higher, whereas Spanish ranked last place indicating lowest density among all the compared languages (Pellegrino F, Coupe C, & Marsico E, 2011). Parker’s findings however indicate that further research seems necessary.

Our study, as most larger studies (Joukamaa et al., 2007; Kokkonen et al., 2001; Sakkinen et al., 2007), indicates no influence of age on alexithymia. In people from 30 to 90 years age might affect alexithymia (Mattila et al., 2006) as an expression of personality changes in those live stages (Specht et al., 2011). Alexithymia peak at the age of 16 in our study

indicates that during puberty personality associated skills are tried out and sophisticated often leading to troubling situations. The constant decrease of alexithymia in the older age groups of our sample indicates that during childhood abilities of recognition, comprehension of emotions as well as abstraction and reflection increase towards adolescence (Bajgar J et al., 2005; Cotton N, 2000).

We found several circumstances gathered that are known to contribute to development of alexithymia. Hispanic participants (Martinez Sanchez & Costa Ball C, 2013; Paez et al., 1995; Vahia IV & Ng B, 2013) with low socioeconomic status (Berenbaum J, 1994; Joukamaa et al., 2007; Kauhanen J., 1993; Kokkonen et al., 2001; Mattila et al., 2006; Mattila et al., 2007; Salminen et al., 1999) which are exposed to rigid parental, scholar and societal- structures that do restrict upward mobility and individualized open minded development. Teachers reported serious difficulties in communicating with the participants. Ethnicity has an effect on alexithymia. Both groups live under comparable environments but still the Indigenous group differs significantly in TAS-20 total score and all factors particularly in Factor 1, (DIF). It seems likely that power distance and oppression apply more to Indigenous participants (Bustos, 2010; El Mercurio, 2009; Mapuche Documentations Center, 2009; Guevara Kamm et al., 2016). In particular the perception of emotional signals is disturbed in those societies that are considered high power distant (Guevara Kamm et al., 2016; Matsumoto, 1989; Paez et al., 1995; Paez et al., 1999).

The SAM results sustain the conclusion that Indigenous group is even more power distant than its Hispanic control group. Indigenous participants believe to have less control over the situation and SAM's dominance dimension significantly differs in that point from the Hispanic sample. Indigenous participants consider themselves to feel more anger. In comparison to the Hispanic control group this variation was also significant. These results indicate that power distance is higher in the Indigenous group (Matsumoto, 1989). Further we assume that emotional matters are perceived and handled differently by Indigenous participants. Another important aspect we have to consider is the mystic way of expression and comprehension within the Mapuche tribe (Durán Pérez, 2000; Pérez Sales

et al., 2005) that leads to deficient perception; involvement of emotional processing seems disturbed. Although there exist over 300 different emotion-related words in the Mapuche tongue it seems conceivable that their way of expression is different to the way western cultures express their feelings. Mapuche people might use corporal expression and gestures to point out their feelings rather than to use an elaborated emotional language (Durán Pérez, 2000). This lack in verbal expression and identifying feelings accurately can be considered as a crucial part of the overall alexithymic concept which explains why the indigenous sample also scores significantly higher in factor 2 (DDF) (Guevara Kamm et al., 2016). What we cannot say with certainty is whether it is the lower socioeconomic position and oppression in comparison to Hispanics or rather the Mapuche-related way of emotional processing what influences the variation of alexithymia most, but since our study is limited to oppressed and low-socioeconomic participants only we estimate that the oppressions apply to both ethnicities abundantly but at least a little more to indigenous. Thus it seems probable that oppression difference between the ethnicities is not a singular but still important reason that leads to such high differences in the measures between the ethnicities. To evaluate that aspect more research seems necessary among high income Mapuche people whom oppression is expected to apply less upon. There are rather strong indications to a multimodal mixed familial- educational and familial-hereditary concept regarding contribution of Alexithymia within the Mapuche tribe that play a role in higher involvement of that syndrome. What we can assume is, that genetic factors have a measurable effect on the variation among the two ethnicities since DIF and EOT was concerned and that familial and environmental (oppression) aspects have an important influence on the variation, since the TAS- score difference also regards factor DDF and because familial influences are known to contribute significantly to the shaping of the syndrome (Valera et al., 2001). There are recent studies that imply that South American indigenous tribes descend from Asian population. Several studies indicate that Asian participants display higher levels of alexithymia than people considered to pertain to western cultures (Taylor et al., 2003) particularly regarding factor 3 (EOT) (Le, Berenbaum, & Raghavan, 2002). Similar mean scores for the TAS 20 have been measured

in a Peruvian sample (>55). Peruvian population is known to have a high indigenous descent. The factorial results and the gender differences of our study indicate similar variations between the sexes as was found in the large Japanese-conducted study which is supporting this theory further (Yoshiya Moriguchi, Gen Komaki, & Motonari Maeda, 2007).

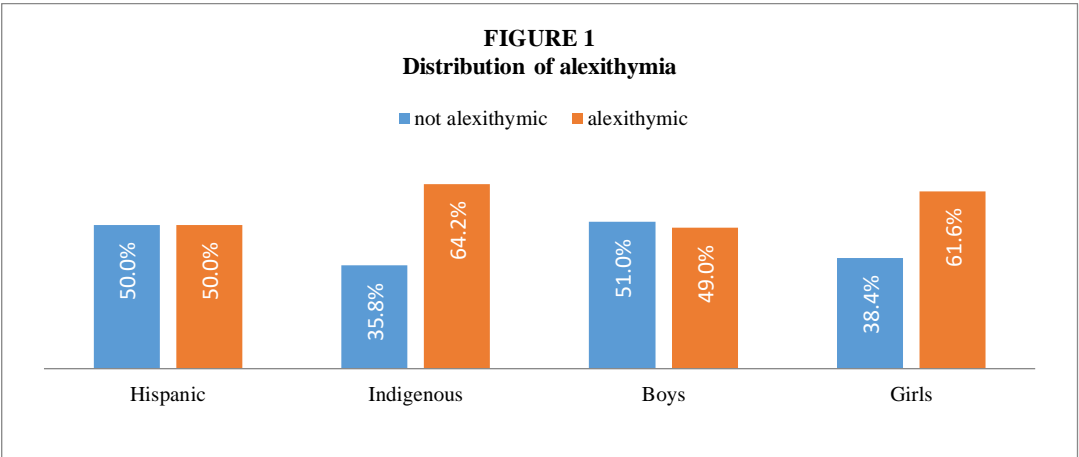
High mean scores bring up the question regarding artifacts. Further research indicates a correlation between Alexithymia and Depression in Women (Mattila et al., 2006; Mattila et al., 2007). We have no indication that our results were affected by such a parameter. Our study had no clinical implications. Even though high alexithymia can be associated to other mental diseases such as Autism Spectrum Disorders (Szatmari et al., 2008), higher TAS 20 Scores are more likely an effect of measuring negative affects rather than alexithymia itself (Marchesi C. & De Panfilis C., 2014). Gender differences in depression detection are most likely artefactual determinants of low symptoms thresholds in woman reporting the symptoms to the health system more often than men who tend to stoic values that influence their expression of feelings to others (Springer K.W. et al., 2008; M Piccinelli & G.Wilkinson, 2000). The strength of this study certainly was its design, which concerned cohort sample selection, stable environmental factors and supervised conduction of the tests. All students participated. Nevertheless this study as with other cohort sample research publications, held several underlying limitations. Age range was small and socioeconomic status of all participants was very low. Assumptions to the general Chilean population are limited. The cut-off points are based on a study with a small adult sample and until today, they have not been validated for teenage populations. On the other hand, those cut-off points have never been seriously questioned and are applied in most of the studies. We decided to use those cut-off points in terms of comparability. Another limitation might be the way we chose our control group. Since the presence of two Hispanic surnames does not guarantee that the subject is not descending from Indigenous ethnicity to some extent, ethnical differences might be even higher. For instance it might be possible that a mestizo male with a first Hispanic surname of the father had children with a mestizo women, carrying a second Hispanic surname of

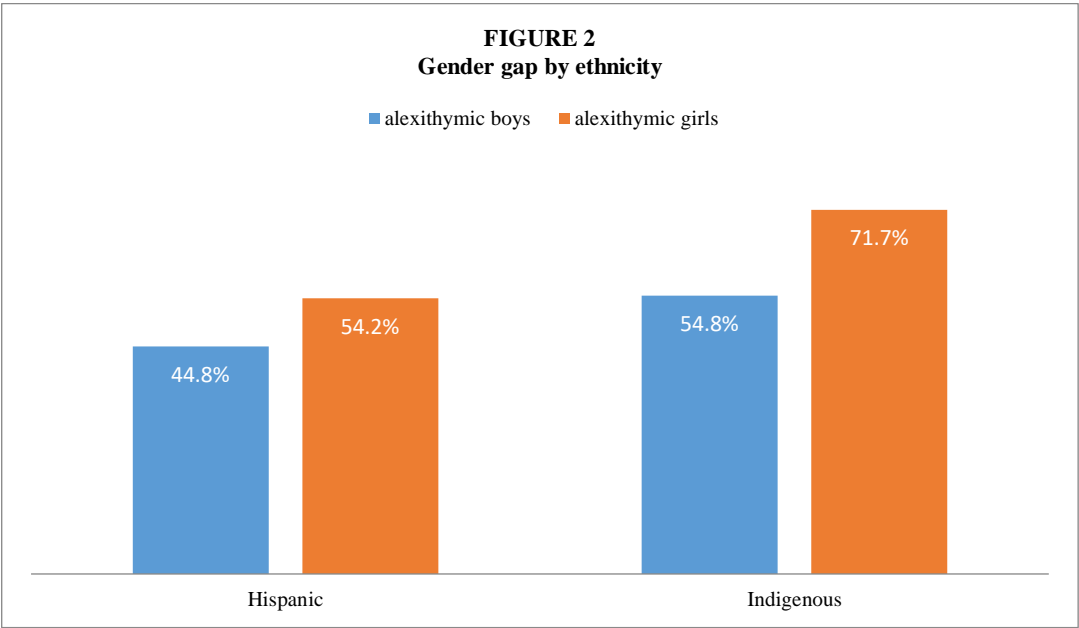
her mother. As consequence the child carried both Hispanic surnames but still featured a certain descent from the Mapuche tribe.

Chapter V

Summary, Significance and Future Goals

The findings suggest that there is a lack of capacities of emotional processing and verbal repertoire in poor Indigenous and Hispanic students making mental diseases and emotional problems less expressible and detectable (Guevara Kamm et al., 2016). Feelings and tenseness might outburst and lead to violent behavior (Manninen M & Joukamaa, 2011; Zimmermann, 2006); students of one school already revolted in the past and were detained by police force (Bustos, 2010; El Mercurio, 2009; Mapuche Documentations Center, 2009). There might be a correlation between the increase of violence and crime in Chile and alexithymia. Less power distant education, support for emotional conversations and assessment of the alexithymic situation should be integrated into the university's prospective trainees' plans. Supervisors might instruct teachers to elaborate early emotional cognitive-behavioral based techniques and to reduce rigid power distant rules as inspector- controls, sex separation, standing up for teachers and adults- and exchange those with more open-minded ones. A governmental rotation plan might help to exchange teachers and prospective teacher students from rural areas who might be alexithymic themselves to more urban ones and vice- versus. A state driven educational task force that assesses the specific needs and ways of thinking of the Mapuche people might also be a helpful tool. Also, organizations like CONADI may help supporting those with their specific knowledge of their people. Reducing alexithymia might help to prevent late diagnosed diseases and lower follow up costs of public health and justice departments.





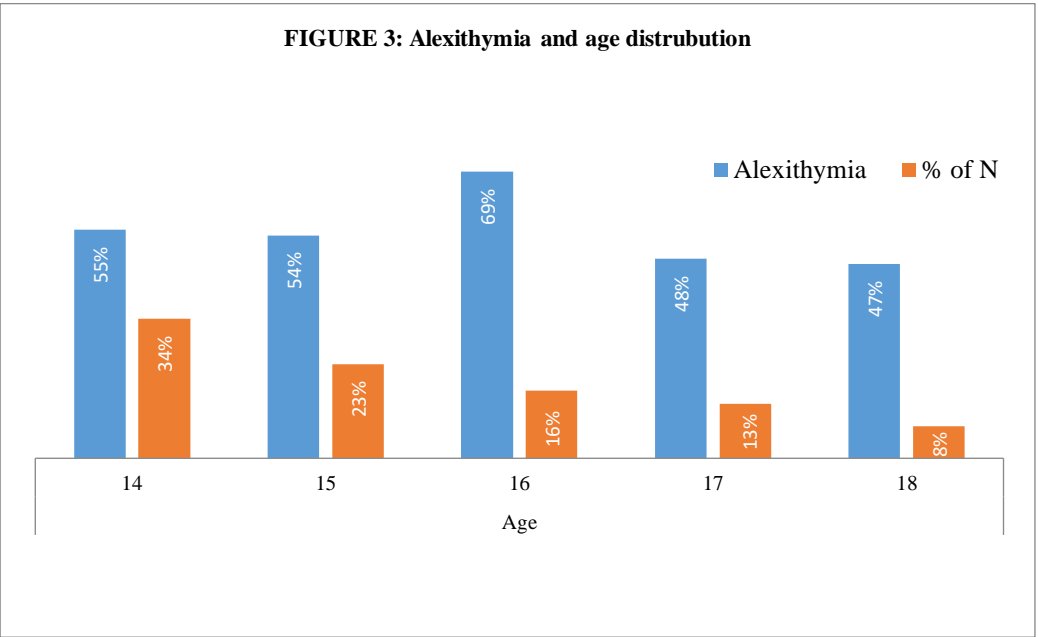


FIGURE 4
Tas 20 means by age

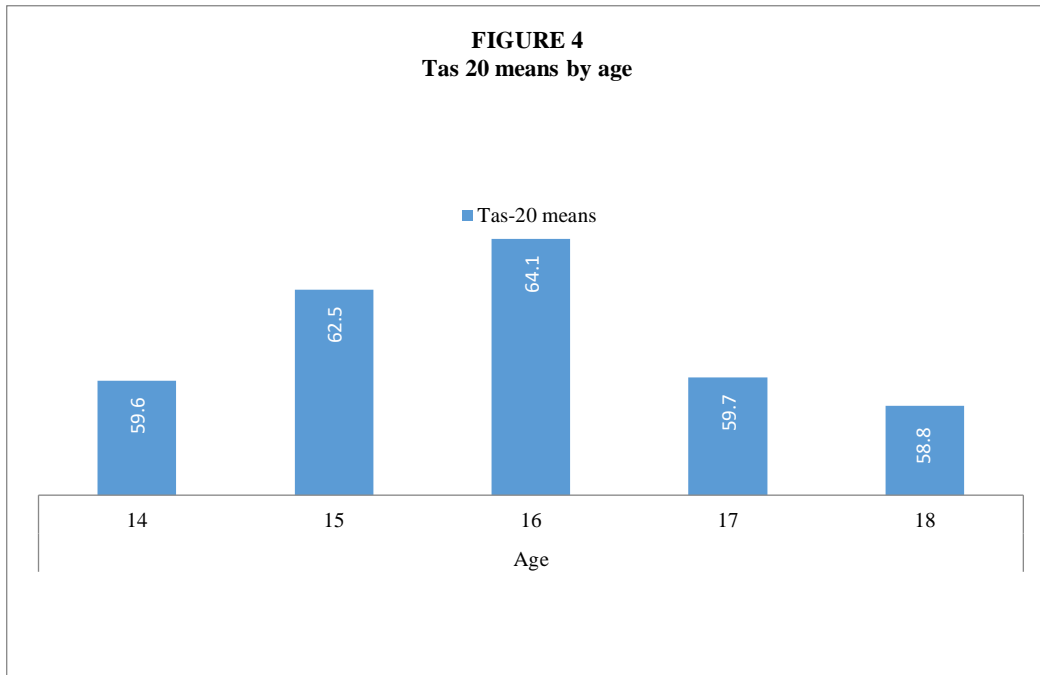
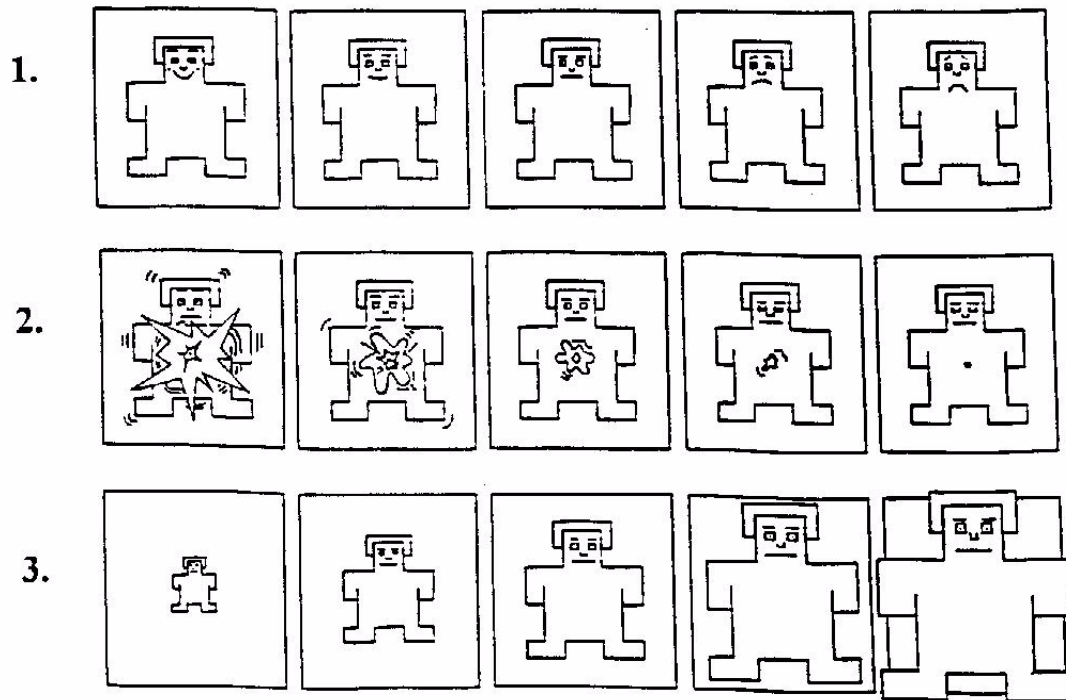


Figure 5
(Self assessment manikin SAM)



Participants were instructed to set mark in **each** line and only on that figure (or in between figures) which they considered to be able to represent their **actual daily** emotional condition best.

Table 1. Parameter Estimates of Factor Loadings and Factor Correlations

Item	Parameter Estimates
Difficulty Identifying Feelings (DIF)	
1.	0.59
3.	0.40
6.	0.50
7.	0.59
9.	0.60
13.	0.59
14.	0.51
Difficulty Describing Feelings (DDF)	
2.	0.65
4.	0.27
11.	0.35
12.	0.18
17.	0.45
Externally Oriented Thinking (EOT)	
5.	0.41
8.	0.01
10.	0.39
15.	0.16
16.	0.35
18.	0.23
19.	0.45
20.	0.04
Factor correlations	
DIF*DDF	0.84***
DIF*EOT	0.05
EOT*DDF	0.02

^a = accepted value, *** $P < 0.01$

Table 2. Measures of fit (CFA)

Chi-square test (df: 167)	(χ^2 /df ratio)	(GFI)	(AGFI)	(RMSEA)
223,56 ^a	1.34 ^a	0.915 ^a	0.89 ^a	0.039 ^a

RMSEA = Root-mean-square error of approximation, AGFI = Adjusted goodness-of-fit, GFI = Goodness-of-fit, ^a = accepted value

Table 3. Descriptive Statistics regarding Ethnicity

Tas 20	All subjects			Hispanic			Indigenous			P
	N	mean	SD	N	mean	SD	N	mean	SD	
TAS Factor 1 (DIF)	227	22.90	6.41	130	22.08	6.77	97	24.01	5.74	<0.05
TAS Factor 2 (DDF)	230	16.09	4.08	132	15.69	4.14	98	16.62	3.97	<0.05
TAS Factor 3 (EOT)	227	22.10	4.24	131	21.66	4.56	96	22.70	3.69	<0.05
TAS total score	225	60.95	10.80	130	59.35	11.09	95	63.14	10.04	<0.01

DIF: Difficulties Identifying Feelings, DDF: Difficulties Describing Feelings, EOT: Externally-Oriented-Thinking, p: significance level, n: sample size, SD: standard deviation/ spread

Table 4. Alexithymia distribution by Ethnicity (With Cut Off)

Variable	All subjects			Hispanic			Indigenous			P
	n	Quantity	% of n	n	Quantity	% of n	N	Quantity	% of n	
Alexithymia	225	126	56	130	65	50	95	61	64.2	<0.05

p: significance level, *n*: sample size

Table 5. Group Statistics regarding Gender

Tas 20	All subjects			Girls			Boys			P
	n	mean	SD	n	mean	SD	n	mean	SD	
TAS Factor 1 (DIF)	227	22.9	6.41	126	23.38	6.83	101	22.31	5.83	<0.05
TAS Factor 2 (DDF)	230	16.09	4.08	129	16.36	4.04	101	15.73	4.13	
TAS Factor 3 (EOT)	227	22.1	4.24	127	21.62	4.28	100	22.7	4.13	<0.05
TAS total score	225	60.95	10.8	125	61.18	9.62	100	60.66	10.71	

DIF: Difficulties Identifying Feelings, DDF: Difficulties Describing Feelings, EOT: Externally-Oriented-Thinking

Table 6. Alexithymia distribution by Gender (With Cut Off)

Variable	All subjects			Girls			Boys			P
	n	Quantity	% of n	n	Quantity	% of n	n	Quantity	% of n	
Alexithymia	225	126	56	125	77	61.6	100	49	49	<0.05

Table 7. Group Statistics regarding ethnical differences among SAM scores

Tas 20	All subjects			Hispanic			Indigenous			P
	N	Mean	SD	N	mean	SD	n	mean	SD	
SAM 1	142	2.08	1.05	77	1.97	1.00	65	2.22	1.11	
SAM 2	138	3.48	1.19	73	3.64	1.19	65	3.30	1.19	<0.05
SAM 3	139	3.51	0.99	73	3.79	0.85	66	3.2	1.04	<0.01

SAM 1: Pleasure, SAM 2: arousal, SAM 3: dominance, p: significance level, n: sample size, SD: standard deviation/ spread

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